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Factors Influencing Employability Self-efficacy of Engineering Students in Taiwan

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(Abstract) This study examines 413 engineer students' ESE and its influencing factors. The results show that students' career resilience (CR) has a significant direct effect on employability self-efficacy (ESE), and perceived labor market competition (PLMC) has a significant effect on ESE through CR. The influence pattern and empirical data of PLMC and CR on ESE has a good fit.

Keywords: Career Resilience; Employability Self-efficacy; Perceived Labor Market; Competition.

1. INTRODUCTION

Employability is highly important to individuals in coping with job insecurity [1]. Employability is becoming an important topic to promote economic growth and development in the economies of Taiwanese high education [2] [3]. As the domestic unemployment rate climbs, engineer students in their learning careers cannot be solved with a confinement to school employment [3]. Engineering students' perceptions of the skills employers seek in new hires were measured and their preparedness for these skills were also indicated potential implications for on-campus curricula and programs to help support students prepare for successful careers[4].

Employability self-efficacy, defined as ''an individual's chance of a employment job on the labor market''. It is important role of perceived employability in dealing with job change and its attendant unemployment hazards. Employability self-efficacy plays the role of helping to improve the employability skills and employment rate for graduate students. ESE explores students' self-perceived, employability, and ambition on the external employability and job [4] [5] [6].

Some research found students' perceived labor market, career resilience and employability self-efficacy have provided them with chances to learn new employment skills and career satisfaction, which may be helpful for their future employability and career development [5][7] [8].

Perceived labor market competition of students' performance in terms of soft skills has considerable significance in ensuring the employability of engineering graduates in campus recruitment drives. It is worthwhile to note that the subjective assessment of performance in soft skills not only involved areas such as team playing, presentation skills, interpersonal communication, and interviewing skills but also involved other areas such as verbal reasoning skills and logical reasoning [4] [9]. Results showed that education, support for career and skill development, current level of job-related skills, and willingness to change jobs were significant predictors of perceived employability [1] [4] [10].

Employability, and its development and management, has taken greater prominence in discussions about the future of people's working lives; it continues to be emphasized as a key organizing principle in the way individuals manage their futures in the labor market. Employability has become an important area of higher education policy, which reflects the relationship between higher education and the labor market [9] [10].

From a social cognitive career theory point of view, the career resilience (CR) to become employability self-efficacy (ESE) has been depicted as actively labor market characteristic of employability self-efficacy [8] [10]. The availability of a validated instrument to measure employability, self-perceived employability and ambition towards ESE could be of much help [11] [12]. Career resilience was define the attitude towards taking responsibility for one's own career and growth while maintaining commitment to the career success [13] [14].

Employability self-efficacy and given feedback from the employability learning results in which belief oneself processing is raised. Research suggests that perceived labor market competition (PLMC) is important to affect employability self-efficacy [10] [14]. It is positively related to students' employability, self-perceived employability, and ambition. It is suggested that the concept of career resilience, derived from social cognitive career theory plays an important role in the development of PLMC and ESE [15] [16].

The results showed that the effects of perceived learning

from employability-related courses, belief oneself, self-reliance and receptivity to change on career resilience were fully mediated by ESE. The authors discuss practical implications and directions for future research.

The paper, Analysis of factors in engineer students' perceived PLMC and ESE, using CR as a mediator variable, discussed the variables which may influence tertiary education student's ESE and found the relationships among the variables. The purposes of this study are to address the 4 following issues.

1. There is no significant correlation between engineer students' PLMC and ESE.
2. There is no significant correlation between engineer students' perceived PLMC and CR.
3. There is no significant correlation between engineer students' CR and ESE.
4. Influence models of engineer students' ESE, PLM, and RC fit the data collected by this study.

2.METHODOLOGY

2.1 Subjects

This study treats 413 engineer students from tertiary education schools as the population, and adopts random sampling and cluster sampling for survey. The Analysis of basic information of engineering students are shown in Table 1.

2.2 Research Tools

The research tool is a 'Questionnaire of Factors Which Influence Engineer students' Employability self-efficacy'. The questionnaire includes Career Resilience Scale, Perceived Labor Market Competition Scale and Employability Self-Efficacy Scale [3] [8] [12] [14]. The Questionnaire of Factors Which Influence Engineer students' ESE was reviewed by three experts for subject contents' suitability to ensure the scale's expert validation. Five engineer students were invited to answer the questionnaire to enhance the validity of the scale's contents. In addition, six tertiary education schools were selected for a pre-test, and 152 students were selected as the pre-test objects in total. The scales used in this study are in self-assessment form, and a Liker 5-point scale is used as the scoring method. There are five levels of choices from 'agree' to 'do not agree;' five equal portions of 5, 4, 3, 2 and 1 are distinguished according to the extent of agreement, and 5 points, 4 points, 3 points, 2 points and 1 point are given in this order. The higher the score an individual receives, the larger extent of agreement the individual has. The scales' factors, number of questions reliability and validity are shown in Table 2.

Table1. Analysis of basic information of engineering students(N=413)

Basic information	Groups	Number of people	%
Gender	Male	365	88.4%
	Female	48	11.6%
Grade	Freshman	45	10.9%
	Sophomore	89	21.5%
	Junior	120	29.1%
	Senior	159	38.5%
School attribute	Public	184	44.6%
	Private	229	55.4%
School classification	Technical universi	275	66.6%
	Technical institut	138	33.4%

Table2. An overview of factors, number of questions, reliability and validity for engineering students' PLMC, ESE and CR scale.

Perceived Labor Market Competition Scale				Career Resilience Scale				Employability Self-Efficacy Scale			
Factor name	No.	Cronbach α	Factor loading	Factor name	No.	Cronbach α	Factor loading	Factor name	No.	Cronbach α	Factor loading
University commitment	3	.88	24.13%	Belief oneself	4	.90	25.24%	Self-perceived employability	4	.87	27.53%
External employability	4	.89	22.03%	Self-reliance	3	.88	22.45%	Employability	3	.88	21.28%
Labor market characteristic	4	.88	19.11%	Receptivity to change	4	.82	18.24%	Ambition	4	.89	18.31%
Total reliability Cronbach α		.90		Total reliability Cronbach α		.91		Total reliability Cronbach α		.90	
Accumulated explained variance			65.27%	Accumulated explained variance			65.93%	Accumulated explained variance			67.12%

2.3 Data Analysis

In processing the survey data used in this study, the collected questionnaires were coded, and Statistical Package for Social Science (SPSS version 12.0) and linear structural analysis (LISREL version 8.5) were used to verify the correlation among the factors of PLM, CR and ESE variables and their

effects in order to achieve the purpose of this study.

3.RESULTS

The empirical results of engineer students' ESE are shown in Figure 1, and are analyzed as follows:

- The estimated value of the direct affecting parameter between PLMC and CR is 0.71 ($t = 6.19$, $p<.05$). This means that PLMC has a significant effect on CR.
- The estimated value of the direct affecting parameter between PLMC and ESE is 0.57 ($t = 7.23$, $p>.05$). This means that PLMC does not necessarily have a significant effect on ESE.
- The estimated value of the direct affecting parameter between CR and ESE is 0.84 ($t = 5.35$, $p<.05$). This means that CR has a significant effect on ESE

In summary, in this study of engineer students' ESE and its influence pattern, CR has a significant effect on ESE, but does not have a significant effect on ESE, and CR has a significant effect on ESE.

4.CONCLUSION

Students' PLMC has a significant direct effect on ESE, and PLMC has a significant effect on ESE through CR. The influence pattern and empirical data of ESE and CR on ESE has a good fit. The influence effects of CR, PLMC and ESE shows that for engineer students, the influence of PLMC on ESE comes mainly through their awareness of CR. In addition, CR has a direct and significant effect on ESE. From the influence of CR, PLMC and ESE, we can clearly see that compared with PLM, CR has a greater influence on ESE [3] [8] [17].

Regarding the test results, according to the goodness of fit test standard by Hair et al, the model in this study has a good overall fit [18] [19]. In the absolute fitness and incremental fitness tests, all indices meet the standard, and have the best fit. Most of the parsimonious fitness indices meet the test standard, and have a good fit. Overall, in the ESE and its influence model established in the study based on theories, both the model and the data have a good fit, and in the parameter estimation most of the estimated values are significant. This shows that all the indices of latent variables have their importance, and only the parameter value of PLMC on ESE is low. Overall, the empirical data have a good explanatory power. Students' PLMC influences CR and 'University commitment' is an important factor which influences PLMC. Students' PLMC influences ESE, 'Belief oneself' and 'Self-reliance' are important factors which influence ESE [6] [9] [10].

The results show that among all latent variables in the model, the direct influence of PLMC on ESE is not significant, indicating that the assumed influence of PLMC on students' ESE needs further testing; this is something worthy of a more in-depth study and validation in the future. Based on test results, although the overall result is acceptable, the model consistency level is not entirely satisfactory, and its Career resilience has a relatively low explanatory power for ESE. The possible reasons are:

- The measurement error variance of the three main variables in the model is too large. Although in the course of the investigation in this study each step was made following reasonable procedures, in a sample survey there are a survey bias and restrictions on the study objects in answering the questionnaire. These can result in a bias between the survey data and the actual situation [8] [20].
- The influence of test indices and method. Currently in the verifying calculation of structural equations, the index value is subject to the sample size, and sometimes the index value may influence each other. When the index is far greater than or much lower than the standard value, the judgment is more accurate; when the index is close to the standard value, we then need to consider the possible influence from the error.

The missing scope of variables. Although a complete research model was tried to be established in this study based on past researches and theories, there has been little domestic research on the topic of students' ESE.

5.IMPLICATION

There may be undetected factors which resulted in a low explanatory power, and there are other variables which have not been identified [15] [16] [17]. Regarding this model's test results, perhaps in the future a further study can be conducted to find the variables either missing in the theories or can be further added or deleted, or more comprehensive empirical data can be collected for testing to improve the consistency between this model and empirical data.

The issue of PLMC agency and structure is at the heart of graduates' transitions to the labor market, mediating their dispositions towards future employment, and the possible experiences and outcomes they encounter. These processes are more firmly implicated in the way they understand and manage their employability, which should be conceived as an active and socially constructed process that engenders engineering graduates' on-going engagement with the labor market.

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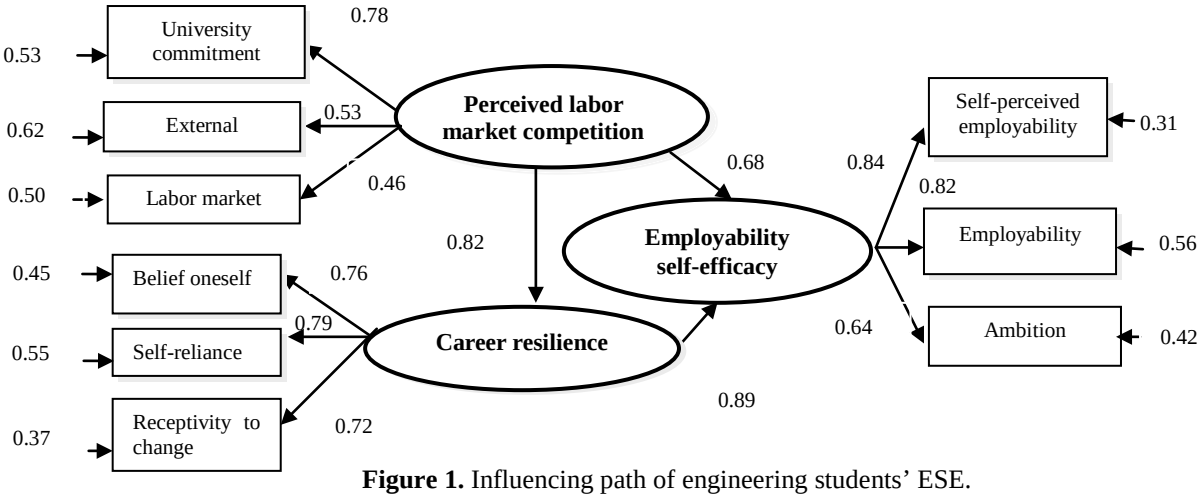

Figure 1. Influencing path of engineering students' ESE.

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